REMARKS

Claims 48, 51-58, 60-67, 72, 75-79 and 93 are currently being prosecuted. Applicant has amended the independent claims to specify that the brush body is a carbon brush body. This is in answer to the decision by the Board of Appeals which indicates that the claims do not include this term. By adding this term to the claims, the arguments are now supported by the claim language, and accordingly, Applicant submits that the claims are allowable for the reasons presented in the previous Appeal Brief.

Request for Interview

Applicant requests that the Examiner contact the undersigned so that an interview may be conducted before the first action, to determine if the present changes make the claims allowable or if additional changes are necessary.

CONCLUSION

In view of the above remarks, it is believed that the claims clearly distinguish over the patents relied on by the Examiner. Accordingly, allowance of all the claims is respectfully requested.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Mr. Robert F. Gnuse (Reg. No. 27,295) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Attached hereto is a marked-up version of the changes made to the application by this Amendment.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment: Version with Markings to Show Changes Made

Appl. No. 07/702,615
Attorney Docket No. 1928-0128P

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The claims have been amended as follows:

48. An electric motor brush assembly for being mounted in a DC electric motor, comprising:

first and second resilient, electrically conductive support arms arranged for being axially spaced from each other with respect to a longitudinal axis of said DC electric motor when said assembly is mounted in the motor,

the support arms being connected electrically in parallel,

each arm carrying a respective carbon brush body, said brush bodies being arranged for contacting a generally cylindrical commutator of the motor,

the commutator having a plurality of circumferential segments and the first and second brush bodies being capable of contacting a single one of said segments simultaneously when the assembly is mounted in the motor,

each arm in combination with the respective brush body thereof having a different respective natural resonance frequency of oscillation;

wherein said first and second support arms have different respective resiliencies so as to have said different frequencies;

wherein parts of said first and second support arms are made of different materials so as to provide said different respective resiliencies.

51. A brush assembly as in claim 48, wherein each said brush body is mounted by an interference fit in an aperture in the respective support arm thereof.

52. In combination, an electric motor brush assembly and a DC electric motor, the brush assembly comprising:

first and second resilient, electrically conductive support arms arranged for being axially spaced from each other with respect to a longitudinal axis of said DC electric motor when said assembly is mounted in the motor,

the support arms being connected electrically in parallel,

each arm carrying a respective carbon brush body, said brush bodies being arranged for contacting a generally cylindrical commutator of the motor,

the commutator having a plurality of circumferential segments and the first and second brush bodies being capable of contacting a single one of said segments simultaneously when the assembly is mounted in the motor,

each arm in combination with the respective brush body thereof having a different respective natural resonance frequency of oscillation;

wherein said first and second support arms have respective portions made of different resilient materials, thereby providing said different resonant frequencies; and

said direct current electric motor comprising

said generally cylindrical commutator, and said first and second brush bodies being in contact therewith.

53. A brush assembly as in claim [53] 48, wherein said two brush bodies, having said different resonant frequencies, remain in reliable electrical contact between said first and second support arms and said commutator, thereby reducing interface resistance between the brush bodies and the commutator, despite oscillations of said arms and brush bodies which occur in response to rotation of said commutator.

54. A brush assembly as in claim 48, further comprising:

third and fourth resilient, electrically conductive support arms arranged for being axially spaced from each other with respect to said longitudinal axis of said DC electric motor when said assembly is mounted in the motor, said third and fourth support arms being connected electrically in parallel, and carrying respective third and fourth brush bodies which are arranged for contacting said generally cylindrical commutator of the motor, the commutator having a plurality of circumferential segments and the third and fourth brush bodies being capable of contacting a single one of said segments simultaneously when the assembly is mounted in the motor.

55. A brush assembly as in claim 54, wherein said third and fourth support arms in combination with the respective brush bodies thereof have different respective natural resonance frequencies of oscillation.

56. A brush assembly as in claim 55, wherein said third and fourth brush bodies, having said different resonant frequencies, remain in reliable electrical contact between said third and fourth support arms and said commutator, thereby reducing interface resistance between the brush bodies

and the commutator, despite oscillations of said arms and brush bodies which occur in response to rotation of said commutator.

57. A brush assembly as in claim 54, wherein the third and fourth brush bodies are substantially diametrically opposite the first and second brush bodies with respect to said motor axis.

58. In combination, an electric motor brush assembly and a DC electric motor, the brush assembly comprising:

first and second resilient, electrically conductive support arms arranged for being axially spaced from each other with respect to a longitudinal axis of said DC electric motor when said assembly is mounted in the motor,

the support arms being connected electrically in parallel,

each arm carrying a respective carbon brush body, said brush bodies being arranged for contacting a generally cylindrical commutator of the motor,

the commutator having a plurality of circumferential segments and the first and second brush bodies being capable of contacting a single one of said segments simultaneously when the assembly is mounted in the motor,

each arm in combination with the respective brush body thereof having a different respective natural resonance frequency of oscillation;

wherein said first and second support arms have respective portions made of different resilient materials, thereby providing said different resonant frequencies; and

third and fourth resilient, electrically conductive support arms arranged for being axially spaced

from each other with respect to said longitudinal axis of said DC electric motor when said assembly is mounted in the motor, said third and fourth support arms being connected electrically in parallel, and carrying respective third and fourth brush bodies which are arranged for contacting said generally cylindrical commutator of the motor, the commutator having a plurality of circumferential segments and the third and fourth brush bodies being capable of contacting a single one of said segments simultaneously when the assembly is mounted in the motor;

said direct current electric motor comprising

said generally cylindrical commutator, and said third and fourth brush bodies being in contact therewith.

60. A brush assembly as in claim 72, wherein said supports are connected electrically in parallel with each other, and are arranged in the assembly for being axially spaced from each other with respect to said longitudinal axis of said motor.

61. A brush assembly as in claim 60, further comprising an end cap, said supports being mounted on said end cap, said brushes being mounted on said end cap via said supports for contacting the commutator of the motor, said commutator having a circumference, and said brushes being mounted so as to be at substantially a common position around said circumference.

62. A brush assembly as in claim 61, wherein said commutator has a plurality of circumferential segments and said first and second brushes are mounted so as to be capable of contacting a common one of said segments simultaneously.

63. A brush assembly as in claim 61, further comprising third and fourth supports mounted on said end cap and third and fourth brushes mounted on said end cap via said third and fourth supports for contacting the commutator of the motor, and said third and fourth brushes being mounted so as to be at substantially a common position around said circumference, said common position being different from the common position of said first and second brushes.

64. A brush assembly as in claim 63, said third support and brush having a third resonant frequency, said fourth support and brush having a fourth resonant frequency, and said third and fourth resonant frequencies being different.

65. A brush assembly as in claim 64, wherein said third and fourth brush bodies, having said different resonant frequencies, remain in reliable electrical contact between said third and fourth supports and said commutator, thereby reducing interface resistance between the brushes and the commutator, despite oscillations of said supports and brushes which occur in response to rotation of said commutator.

66. A brush assembly as in claim 63, wherein said commutator has a plurality of segments and said third and fourth brushes are mounted so as to be capable of contacting a common one of said segments simultaneously.

67. A brush assembly as in claim 63, wherein the first and second brushes are

substantially diametrically opposite the third and fourth brushes with respect to said motor axis.

72. An electric motor brush assembly mounted in a DC electric motor, said brush assembly comprising:

first and second resilient, electrically conductive brush supports, the supports carrying respective first and second carbon brushes which are thereby arranged for contacting a generally cylindrical commutator of the motor;

the supports being mounted to a common base which is spaced from a longitudinal axis of the motor and the brushes extending toward a common circumferential region of said commutator;

said first support and brush having a first resonant frequency, said second support and brush having a second resonant frequency, and said first and second resonant frequencies being different;

wherein a portion of said first support has a different resiliency than a corresponding portion of said second support for causing said first frequency to be different from said second frequency;

wherein said portions of said supports are made of different resilient materials, thereby having said different resiliencies.

75. A brush assembly as in claim 72, wherein each said brush is mounted by an interference fit in an aperture in the respective support thereof.

76. A brush assembly as in claim 72, wherein said first and second brush bodies, having said different resonant frequencies, remain in reliable electrical contact between said first and second supports and said commutator, thereby reducing interface resistance between the brushes and the

commutator, despite oscillations of said supports and brushes which occur in response to rotation of said commutator.

77. An electric motor brush assembly for being mounted in a DC motor comprising:

first and second resilient, electrically conductive supports arranged for being mounted in such motor, the supports carrying respective first and second carbon brushes which are thereby arranged for contacting a commutator of such motor when the assembly is mounted in the motor;

the supports being axially spaced from each other along said axis of said motor;

said first support and brush having a first resonant frequency, said second support and brush having a second resonant frequency, and said first and second resonant frequencies being different;

wherein said first and second supports have respective portions made of different resilient materials, thereby providing said different resonant frequencies.

78. In combination, an electric motor brush assembly and a DC motor, said brush assembly comprising:

first and second resilient, electrically conductive supports arranged for being mounted in the motor,

the supports carrying respective first and second carbon brushes which are thereby arranged for contacting a commutator of the motor when the assembly is mounted in the motor;

the supports being axially spaced from each other along said axis of said motor;

said first support and brush having a first resonant frequency, said second support and brush

having a second resonant frequency, and said first and second resonant frequencies being different;

wherein said first and second supports have respective portions made of different resilient materials, thereby providing said different resonant frequencies; and

said direct current electric motor comprising

said commutator, said commutator being generally cylindrical, and said first and second brushes of the brush assembly being in contact therewith.

79. A brush assembly as in claim 78, wherein said commutator has a plurality of circumferential segments and said first and second brushes are mounted so as to be capable of contacting a common one of said segments simultaneously.

93. An electric motor brush assembly for being mounted in a DC electric motor, comprising:

first and second resilient, electrically conductive support arms arranged for being axially spaced from each other with respect to a longitudinal axis of said DC electric motor when said assembly is mounted in the motor,

the support arms being connected electrically in parallel,

each arm carrying a respective carbon brush body, said brush bodies being arranged for contacting a generally cylindrical commutator of the motor, the commutator having a plurality of circumferential segments and the first and second brush bodies being capable of contacting a single

one of said segments simultaneously when the assembly is mounted in the motor, each arm in combination with the respective brush body thereof having a different respective natural resonance frequency of oscillation.